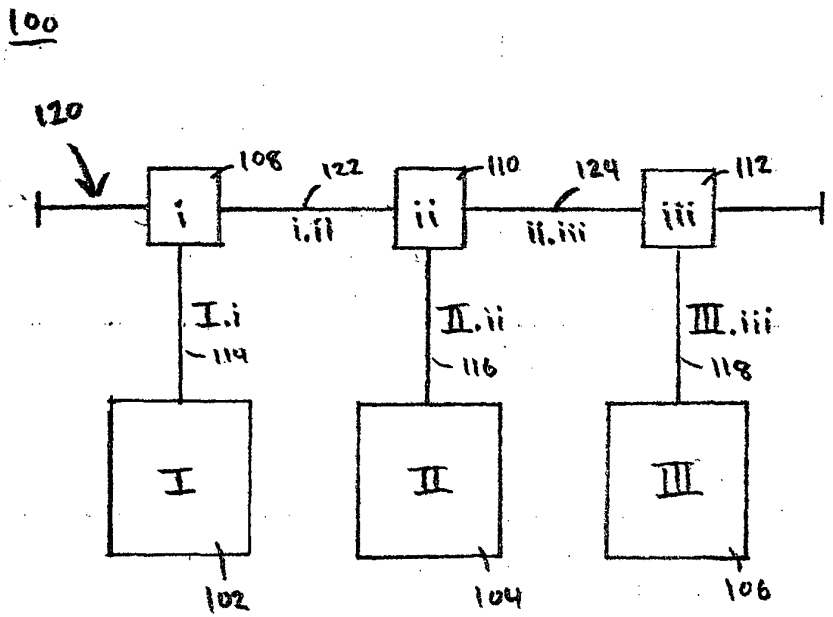

100
120
108
122
110
124
112
i
i.ii
ii
ii.iii
iii
I.i
114
II.ii
116
III.iii
118
I
II
III
102
104
106

FIG. 1

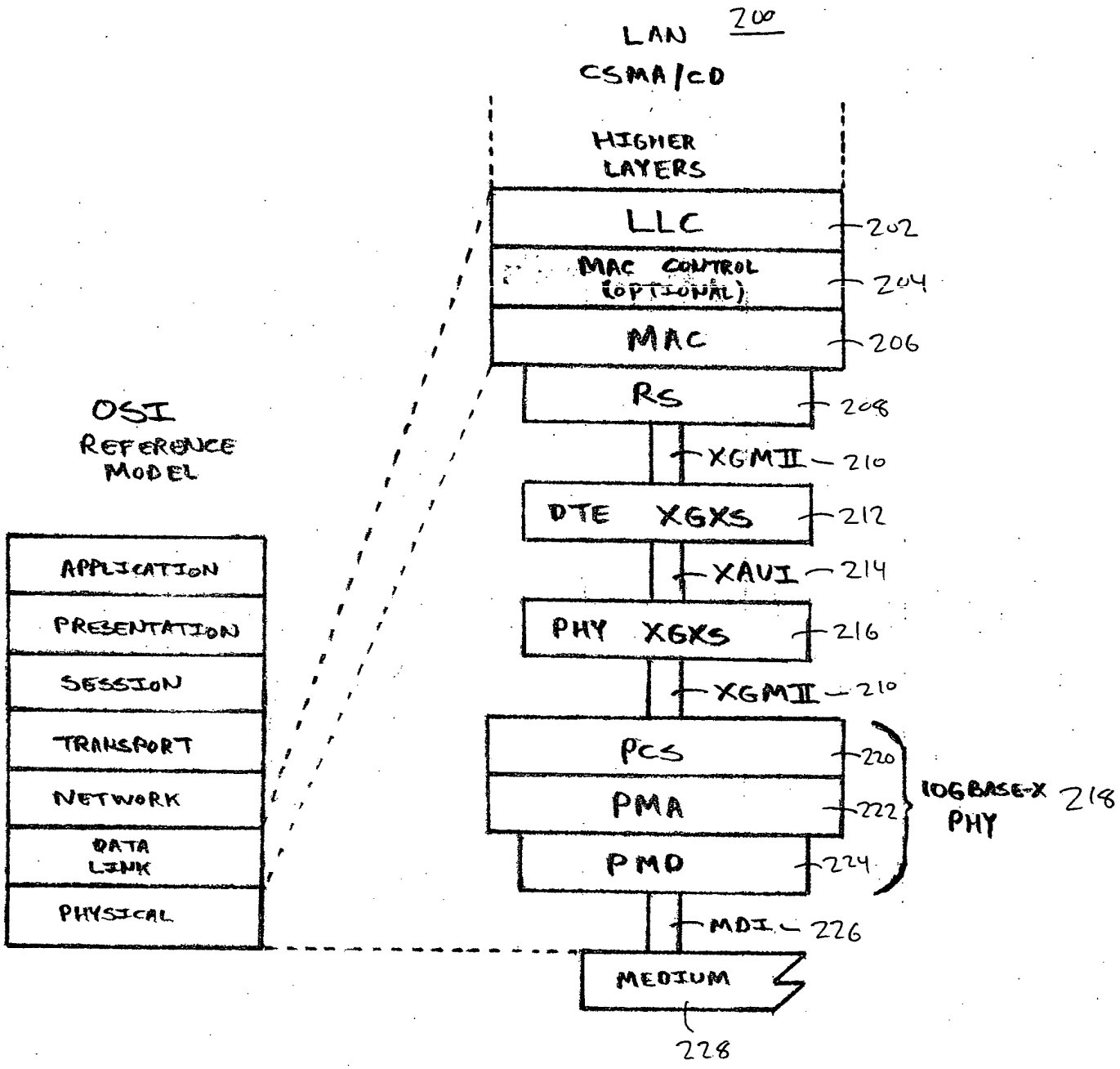

LAN
200
CSMA/CD
HIGHER LAYERS
LLC
202
MAC CONTROL (OPTIONAL)
204
MAC
206
RS
208
XGMII
210
DTE XGXS
212
XAUI
214
PHY XGXS
216
XGMII
210
PCS
220
PMA
222
PMD
224
10GBASE-X PHY
218
MDI
226
MEDIUM
228
OSI REFERENCE MODEL
APPLICATION
PRESENTATION
SESSION
TRANSPORT
NETWORK
DATA LINK
PHYSICAL

FIG. 2

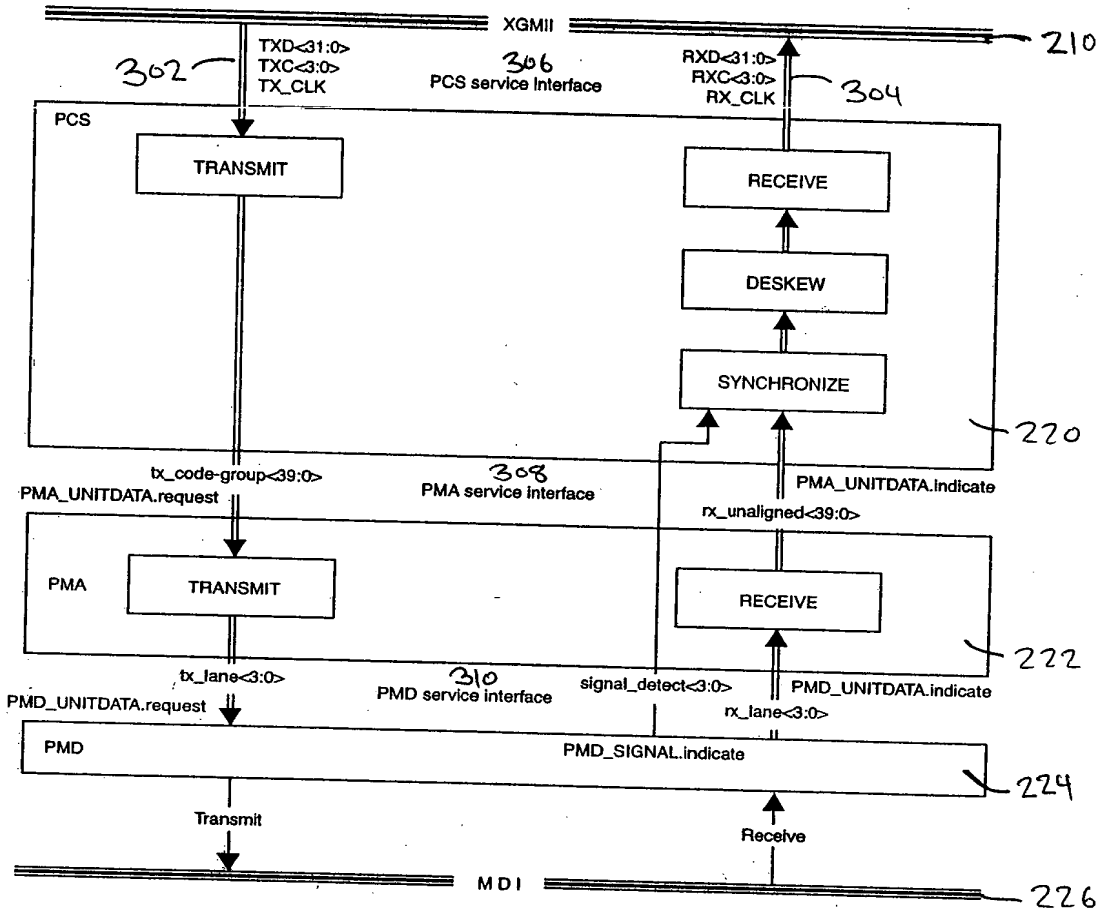

XGMII
210
302
TXD<31:0>
TXC<3:0>
TX_CLK
306
PCS service interface
RXD<31:0>
RXC<3:0>
RX_CLK
304
PCS
TRANSMIT
RECEIVE
DESKEW
SYNCHRONIZE
220
tx_code-group<39:0>
PMA_UNITDATA.request
308
PMA service interface
PMA_UNITDATA.indicate
rx_unaligned<39:0>
PMA
TRANSMIT
RECEIVE
222
tx_lane<3:0>
PMD_UNITDATA.request
310
PMD service interface
signal_detect<3:0>
PMD_UNITDATA.indicate
rx_lane<3:0>
PMD
PMD_SIGNAL.indicate
224
Transmit
Receive
MDI
226

FIG. 3

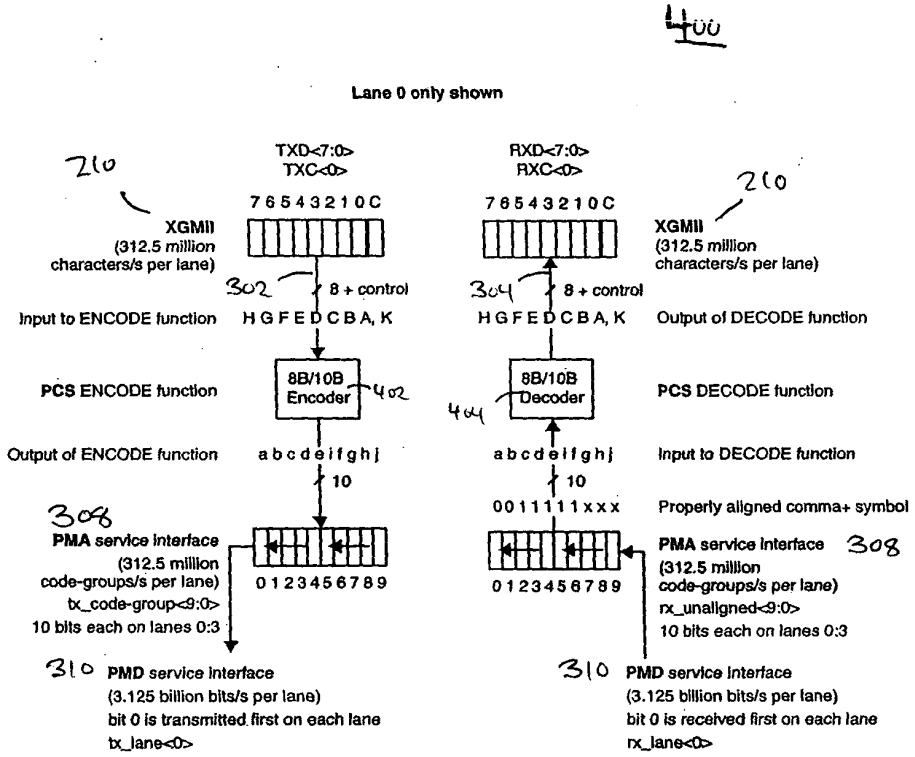

400
Lane 0 only shown
210
TXD<7:0>
TXC<0>
7 6 5 4 3 2 1 0 C
XGMII
(312.5 million
characters/s per lane)
302
8 + control
Input to ENCODE function
H G F E D C B A, K
PCS ENCODE function
8B/10B
Encoder
402
Output of ENCODE function
a b c d e i f g h j
10
308
PMA service interface
(312.5 million
code-groups/s per lane)
tx_code-group<9:0>
10 bits each on lanes 0:3
0 1 2 3 4 5 6 7 8 9
310
PMD service interface
(3.125 billion bits/s per lane)
bit 0 is transmitted first on each lane
tx_lane<0>
RXD<7:0>
RXC<0>
7 6 5 4 3 2 1 0 C
210
XGMII
(312.5 million
characters/s per lane)
304
8 + control
H G F E D C B A, K
Output of DECODE function
8B/10B
Decoder
404
PCS DECODE function
a b c d e i f g h j
Input to DECODE function
10
0 0 1 1 1 1 1 x x x
Properly aligned comma+ symbol
PMA service interface
308
(312.5 million
code-groups/s per lane)
rx_unaligned<9:0>
10 bits each on lanes 0:3
0 1 2 3 4 5 6 7 8 9
310
PMD service interface
(3.125 billion bits/s per lane)
bit 0 is received first on each lane
rx_lane<0>

FIG. 4

XGMII TXC	XGMII TXD	PCS code-group	Description
0	00 through FF	Dxx.y	Normal data transmission
1	07	K28.0 or K28.3 or K28.5	Idle in ||I||
1	07	K28.5	Idle in ||T||
1	9C	K28.4	Sequence
1	FB	K27.7	Start
1	FD	K29.7	Terminate
1	FE	K30.7	Error
1	Other value in Table 36-2	See Table 36-2	Reserved XGMII character
1	Any other value	K30.7	Invalid XGMII character
NOTE—Values in TXD column are in hexadecimal.			

Table 36-2—Valid special code-groups

Code-Group Name	76543210 (Hex value)	Octet Bits HGFEDCBA	Current RD − abcdei fghj	Current RD + abcdei fghj	Notes
K28.0	1C	000 11100	001111 0100	110000 1011	1, 2
K28.1	3C	001 11100	001111 1001	110000 0110	1, 2
K28.2	5C	010 11100	001111 0101	110000 1010	1, 2
K28.3	7C	011 11100	001111 0011	110000 1100	1, 2
K28.4	9C	100 11100	001111 0010	110000 1101	1, 2
K28.5	BC	101 11100	001111 1010	110000 0101	1, 2
K28.6	DC	110 11100	001111 0110	110000 1001	1, 2
K28.7	FC	111 11100	001111 1000	110000 0111	1, 2
K23.7	F7	111 10111	111010 1000	000101 0111	2
K27.7	FB	111 11011	110110 1000	001001 0111	2
K29.7	FD	111 11101	101110 1000	010001 0111	2
K30.7	FE	111 11110	011110 1000	100001 0111	2
NOTE 1—Reserved.					
NOTE 2—Contains 1 comma.					

FIG. 5

Code	Ordered_Set	Number of code-groups	Encoding
‖I‖	**Idle**		**Substitute for XGMII Idle**
‖K‖	Sync column	4	/K28.5/K28.5/K28.5/K28.5/
‖R‖	Skip column	4	/K28.0/K28.0/K28.0/K28.0/
‖A‖	Align column	4	/K28.3/K28.3/K28.3/K28.3/
	Encapsulation		
‖S‖	Start column	4	/K27.7/Dx.y/Dx.y/Dx.y/[a]
‖T‖	Terminate column	4	Terminate code-group in any lane
‖T_0‖	Terminate in Lane 0	4	/K29.7/K28.5/K28.5/K28.5/
‖T_1‖	Terminate in Lane 1	4	/Dx.y/K29.7/K28.5/K28.5/[a]
‖T_2‖	Terminate in Lane 2	4	/Dx.y/Dx.y/K29.7/K28.5/[a]
‖T_3‖	Terminate in Lane 3	4	/Dx.y/Dx.y/Dx.y/K29.7/[a]
	Control		
/E/	Error code-group	1	/K30.7/
	Link Status		
‖Q‖	Sequence ordered_set	4	/K28.4/Dx.y/Dx.y/Dx.y/[a]
‖LF‖	Local Fault signal	4	/K28.4/D0.0/D0.0/D1.0/
‖RF‖	Remote Fault signal	4	/K28.4/D0.0/D0.0/D2.0/
‖Qrsvd‖	Reserved	4	!‖LF‖ and !‖RF‖
	Reserved		
‖Fsig‖	Signal ordered_set	4	/K28.2/Dx.y/Dx.y/Dx.y/[a,b]

[a]/Dx.y/ indicates any data code-group.
[b]Reserved for INCITS T11.

FIG. 6

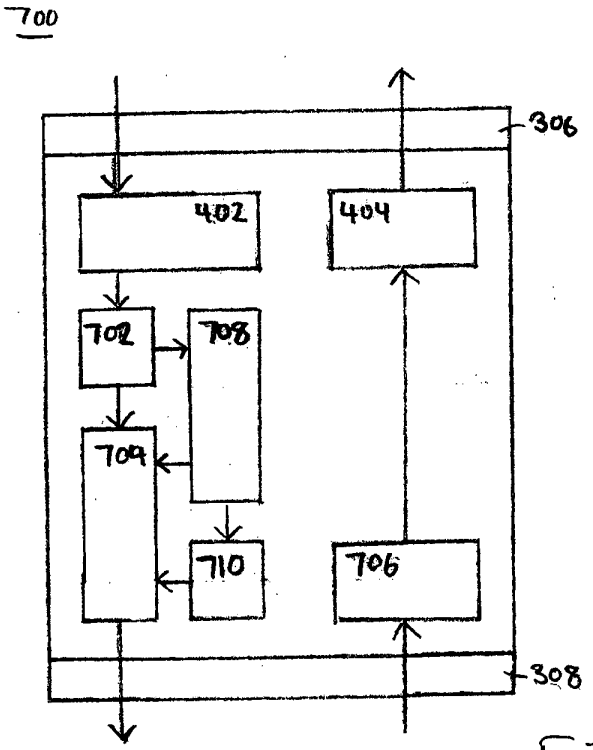


FIG. 7

FIG. 8A

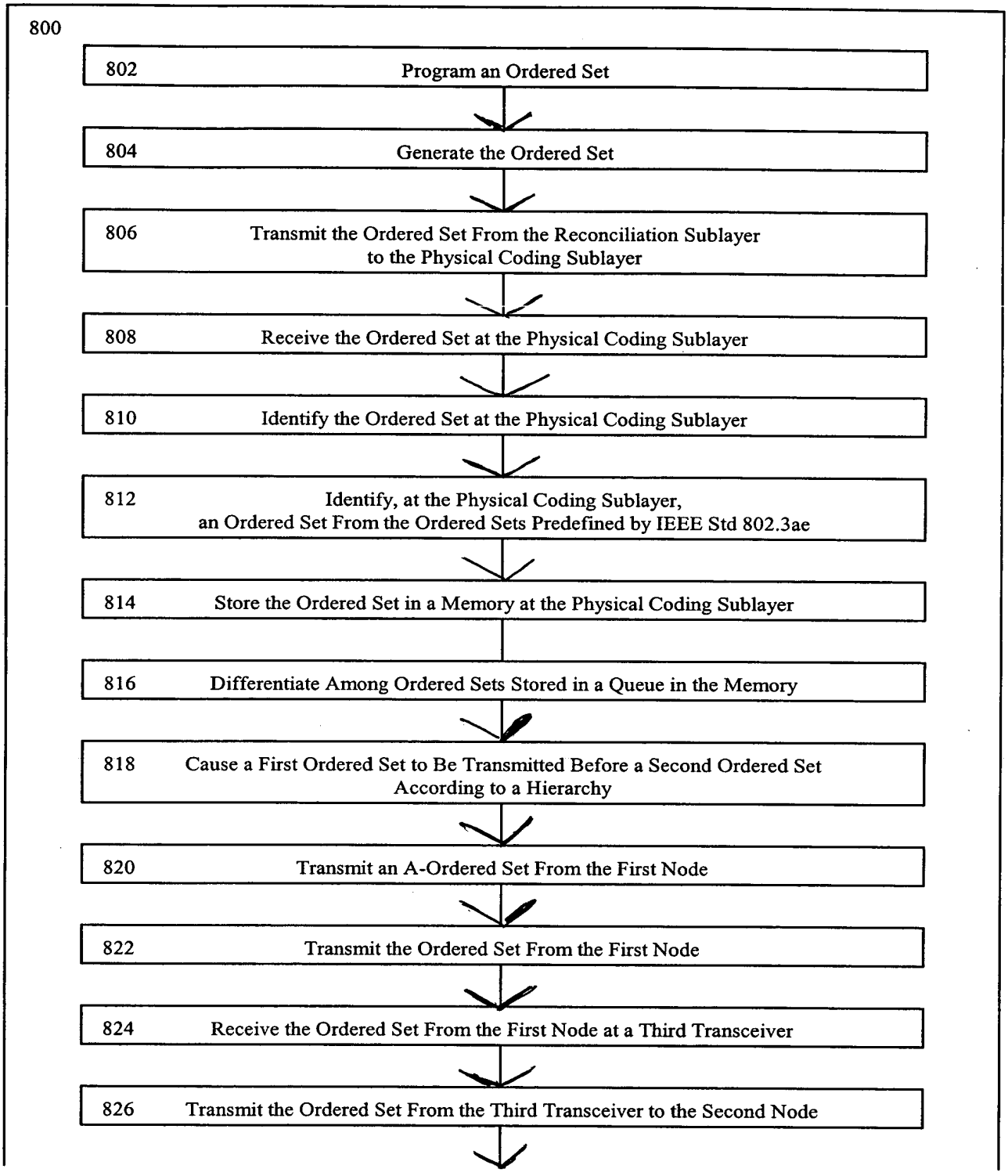

800
802
Program an Ordered Set
804
Generate the Ordered Set
806
Transmit the Ordered Set From the Reconciliation Sublayer to the Physical Coding Sublayer
808
Receive the Ordered Set at the Physical Coding Sublayer
810
Identify the Ordered Set at the Physical Coding Sublayer
812
Identify, at the Physical Coding Sublayer, an Ordered Set From the Ordered Sets Predefined by IEEE Std 802.3ae
814
Store the Ordered Set in a Memory at the Physical Coding Sublayer
816
Differentiate Among Ordered Sets Stored in a Queue in the Memory
818
Cause a First Ordered Set to Be Transmitted Before a Second Ordered Set According to a Hierarchy
820
Transmit an A-Ordered Set From the First Node
822
Transmit the Ordered Set From the First Node
824
Receive the Ordered Set From the First Node at a Third Transceiver
826
Transmit the Ordered Set From the Third Transceiver to the Second Node

FIG. 8B

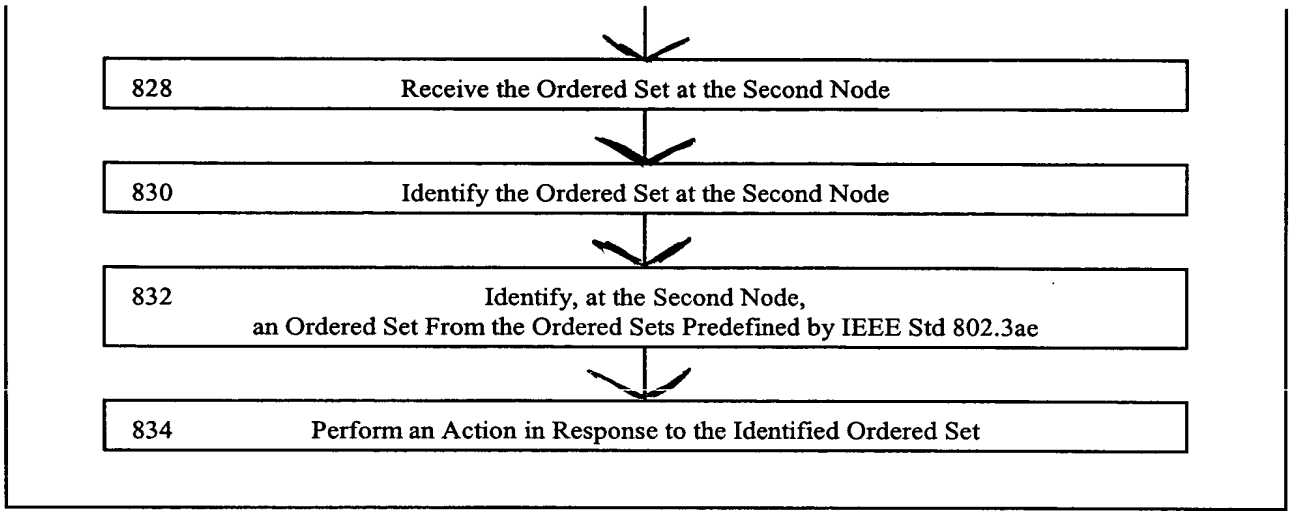
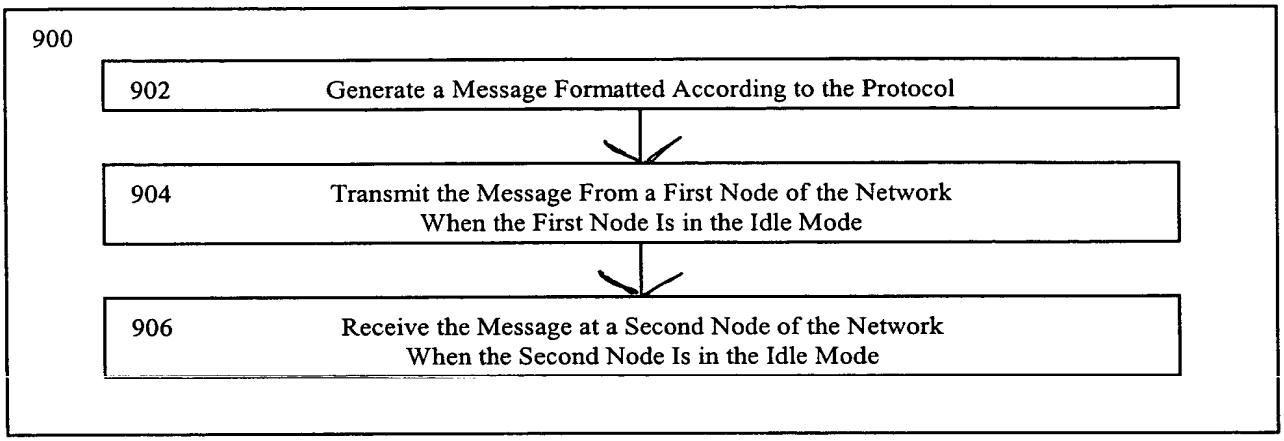

828
Receive the Ordered Set at the Second Node
830
Identify the Ordered Set at the Second Node
832
Identify, at the Second Node,
an Ordered Set From the Ordered Sets Predefined by IEEE Std 802.3ae
834
Perform an Action in Response to the Identified Ordered Set

FIG. 9


900
902
Generate a Message Formatted According to the Protocol
904
Transmit the Message From a First Node of the Network When the First Node Is in the Idle Mode
906
Receive the Message at a Second Node of the Network When the Second Node Is in the Idle Mode